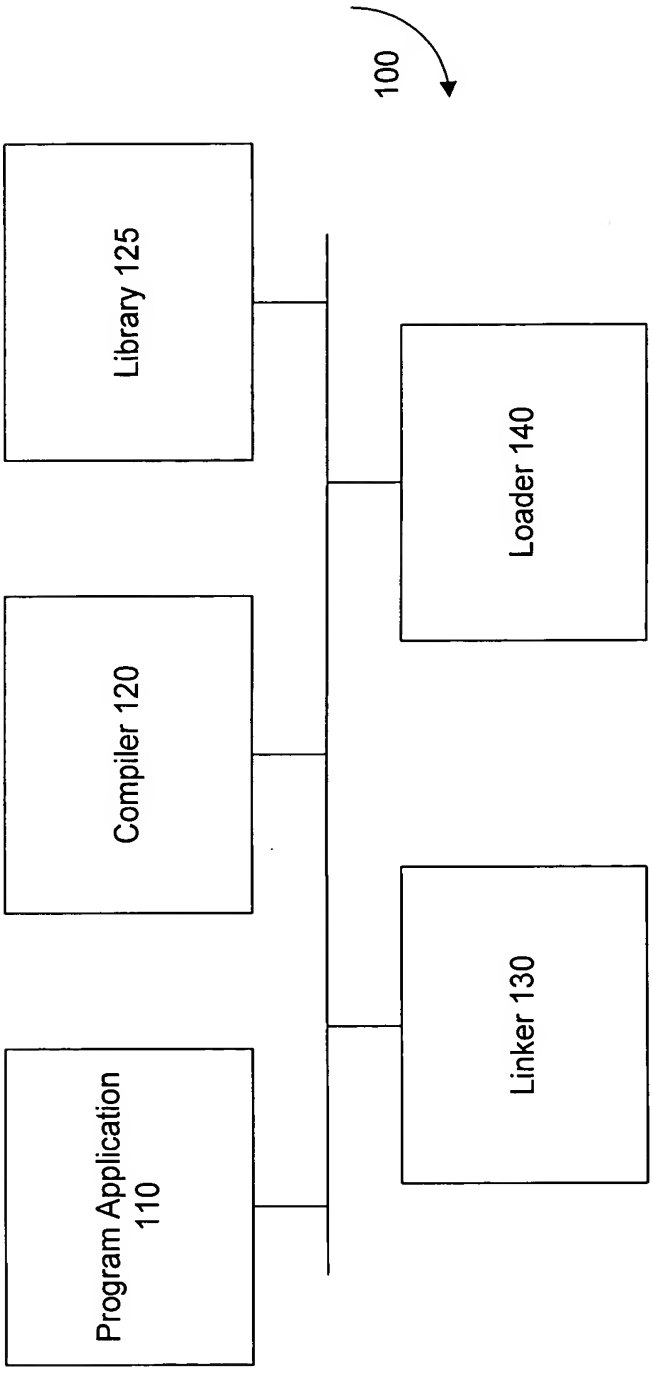
100
Library 125
Loader 140
Compiler 120
Linker 130
Program Application 110

FIG. 1

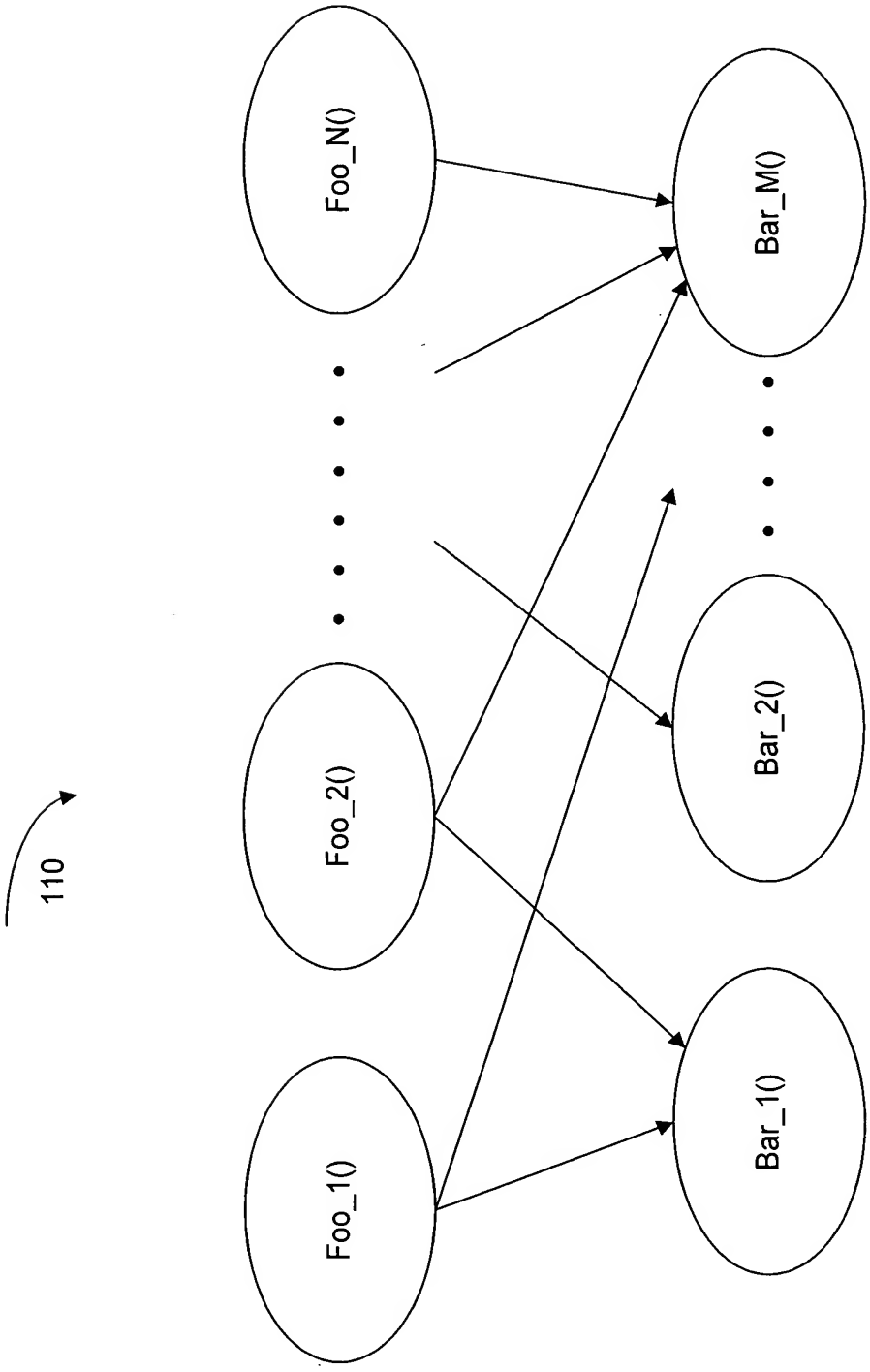

FIG. 2

```
bar(int p) {
    if (p==0) {
    310
    . . .
    320
    } else {
    330
    . . .
    340
    }
}
```

```
bar_clone_1(int p) {
    if (p==0) {
    310
    . . .
    320
    }
}
```

```
bar_clone_2(int p) {
    if (p!=0) {
    330
    . . .
    340
    }
}
```

FIG. 3

```
#pragma clone bar no_parms_overlap

int bar(int* p, int* q) {

410A    for (. . . ){
          *q++ = . . .
          . . .
          . . . = *p++;
420A    }
}
```

FIG. 4A

```
#pragma clone bar parm_align(1)=16, parm_align(2)=16

int bar(char* p, char* q) {

410B    for (i=0; I <n; i++ ){
          *q++ = *p++;
420B    }
}
```

FIG. 4B

```
#pragma clone bar parm_value(2)=1

int bar(int p, int q) {

410C    if (q != 1) {
          . . .
420C    }
}
```

FIG. 4C

```
#pragma clone bar parm_value(1) > parm_value(2)

int bar(int p, int q) {

410D    if (p <= q) {
          . . .
420D    }
}
```

FIG. 4D

Title: Cloning Programming Code
Inventor: David Xinliang Li et al.
USPTO App. No.: not yet assigned
HP PDNO: 200313032-1

<clone>_<original_function_name>_<condition_1>_ . . . <condition_n>

FIG. 5

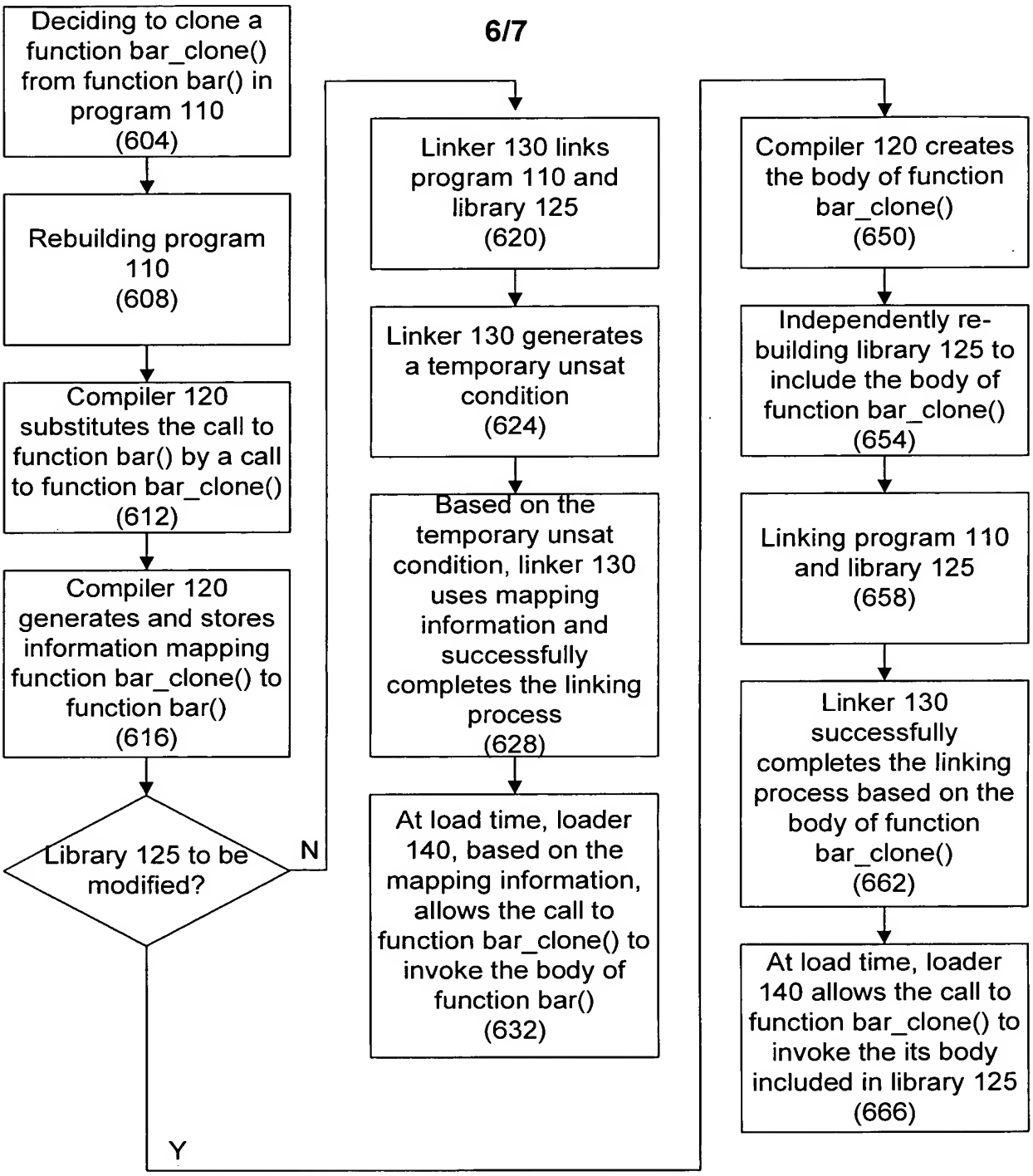
Deciding to clone a function bar_clone() from function bar() in program 110 (604)
Rebuilding program 110 (608)
Compiler 120 substitutes the call to function bar() by a call to function bar_clone() (612)
Compiler 120 generates and stores information mapping function bar_clone() to function bar() (616)
Library 125 to be modified?
N
Y
Linker 130 links program 110 and library 125 (620)
Linker 130 generates a temporary unsat condition (624)
Based on the temporary unsat condition, linker 130 uses mapping information and successfully completes the linking process (628)
At load time, loader 140, based on the mapping information, allows the call to function bar_clone() to invoke the body of function bar() (632)
Compiler 120 creates the body of function bar_clone() (650)
Independently re-building library 125 to include the body of function bar_clone() (654)
Linking program 110 and library 125 (658)
Linker 130 successfully completes the linking process based on the body of function bar_clone() (662)
At load time, loader 140 allows the call to function bar_clone() to invoke the its body included in library 125 (666)

FIG. 6

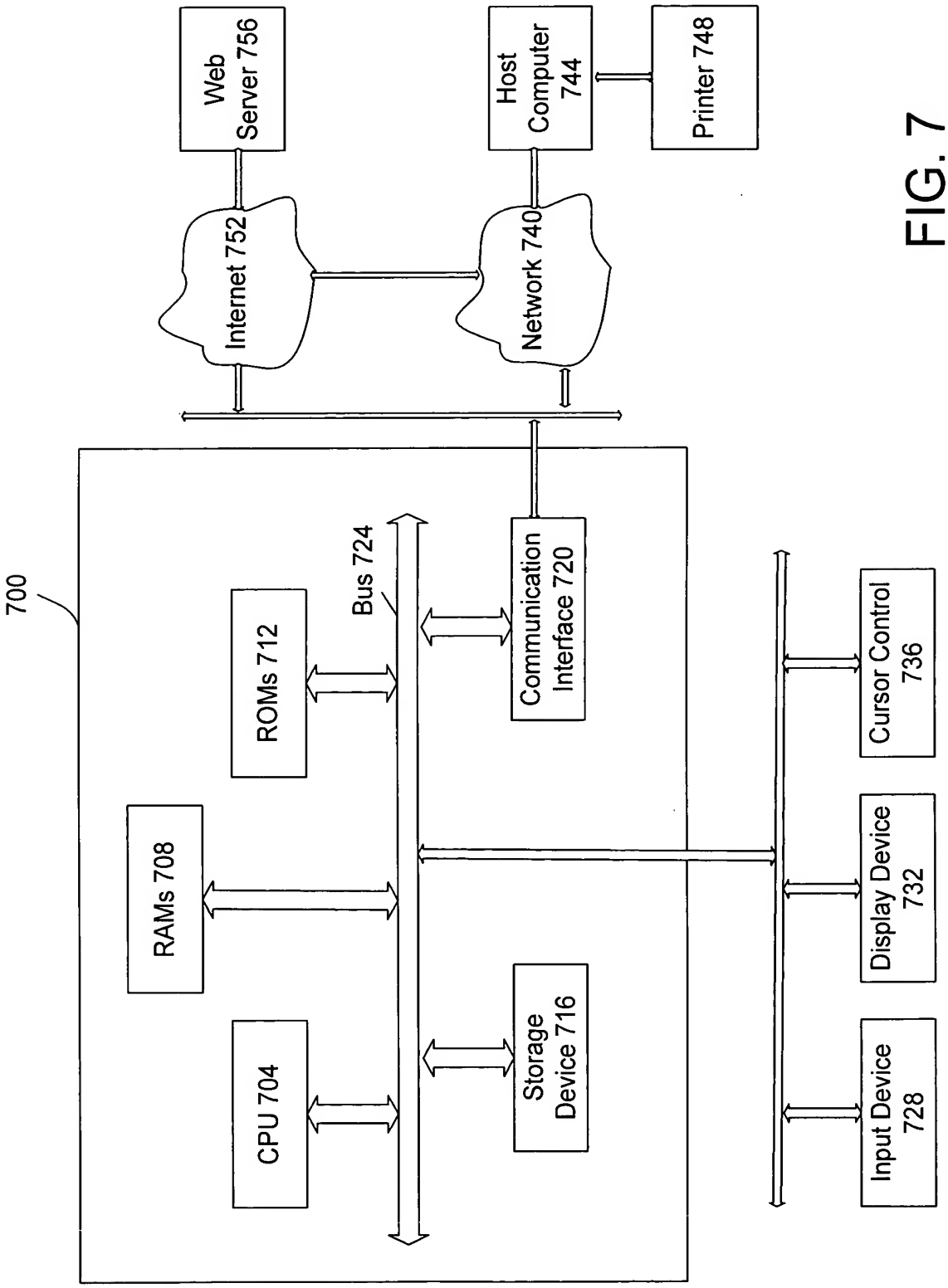
Web Server 756
Host Computer 744
Printer 748
Internet 752
Network 740
700
Bus 724
Communication Interface 720
ROMs 712
RAMs 708
CPU 704
Storage Device 716
Cursor Control 736
Display Device 732
Input Device 728

FIG. 7